Credit hours: 4

Contact/Instructional hours: 50 (30 Theory Hours, 20 Lab Hours)

Prerequisite(s) and/or Corequisite(s):
Prerequisite: IT203 Database Development or equivalent

Course Description:
This course examines Entity-Relationship modeling and data normalization by analyzing how keys and constraints are used to enforce design restrictions. Students will use SQL to build functionality commonly needed by applications. Database objects covered includes stored procedures, triggers, and constraints.
Syllabus: Database Design and Implementation

Instructor: ________________________________
Office hours: ________________________________
Class hours: ________________________________

Major Instructional Areas
1. Database modeling
2. Database normalization
3. Data Definition Language (DDL) and Data Manipulation Language (DML)
4. Table keys and constraints
5. SQL queries
6. Indexes and views
7. Functions and stored procedures
8. Transaction processing
9. XML documents

Course Objectives
1. Create Entity-Relationship Diagrams (ERDs).
2. Use normalization to improve database design.
3. Implement keys and constraints.
4. Use SQL Data Definition Language (DDL) and Data Manipulation Language (DML) commands.
5. State the purpose of views, indexes, triggers, functions, and stored procedures in terms of their application and usage.
6. Execute SQL queries.
7. Use indexes to optimize performance.
8. Create and use views.
9. Create and use functions, stored procedures, and triggers.
10. Configure and use transaction processing.
11. Create and use XML documents.
12. Use XML Path (XPath) queries to retrieve XML data.

Course Outline
Note: All graded activities, except the Project and exams, are listed below in the pattern of <Unit Number>.<Assignment Number>. For example, Lab 2.1 refers to the first lab activity in Unit 2.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Activities</th>
</tr>
</thead>
</table>
| 1—Database Planning and Design | • Content Covered:  
  * Database Design and Implementation  
    * Chapter 1, “Database Planning, Design, and Administration”  
    * Chapter 2, “Entity-Relationship Modeling”  
  * Labs: 1.1, 1.2  
  * Assignments: 1.1 |
| 2—Database | • Read from Database Design and Implementation:  
  * Chapter 3, “Normalization” |
<table>
<thead>
<tr>
<th>Unit</th>
<th>Activities</th>
</tr>
</thead>
</table>
| Normalization | - Labs: 2.1  
- Assignments: 2.1  
- Course Project: Part 1 |
| 3— SQL Language Review | - Read from *Database Design and Implementation*:  
  - Chapter 4, “SQL in a Nutshell”  
  - Chapter 5, “SELECT Statement: Common Elements”  
- Labs: 3.1  
- Assignments: 3.1  
- Course Project: Part 2  
- Quizzes: 3.1 |
| 4— Queries and Joins | - Read from *Database Design and Implementation*:  
  - Chapter 6, “SELECT Statements, Table Expressions, and Subqueries”  
  - Chapter 7, “SELECT Statement: The FROM Clause”  
- Labs: 4.1  
- Assignments: 4.1  
- Course Project: Part 3  
- Quizzes: 4.1 |
| 5— Subqueries and Aggregates | - Read from *Database Design and Implementation*:  
  - Chapter 8, “SELECT Statement: The WHERE Clause”  
  - Chapter 9, “SELECT Statement: SELECT Clause and Aggregation Functions”  
- Labs: 5.1  
- Course Project: Part 4  
- Assignments: 5.1  
- Quizzes: 5.1 |
| 6— Tables and Constraints | - Read from *Database Design and Implementation*:  
  - Chapter 10, “Creating Tables”  
  - Chapter 11, “Specifying Integrity Constraints”  
- Labs: 6.1  
- Assignments: 6.1  
- Course Project: Part 5  
- Exam I |
| 7— Indexes and Views | - Read from *Database Design and Implementation*:  
  - Chapter 12, “Using Indexes”  
  - Chapter 13, “Views”  
- Labs: 7.1  
- Assignments: 7.1  
- Course Project: Part 6  
- Quizzes: 7.1 |
| 8— Stored Procedures, Functions, and Triggers | - Read from *Database Design and Implementation*:  
  - Chapter 14, “Stored Procedures”  
  - Chapter 15, “Stored Functions”  
  - Chapter 16, “Triggers”  
- Labs: 8.1  
- Assignments: 8.1  
- Course Project: Part 7  
- Quizzes: 8.1 |
| 9— | - Read from *Database Design and Implementation*: |
### Instructional Methods

This curriculum is designed to promote a variety of teaching strategies that support the outcomes described in the course objectives and that foster higher cognitive skills. Delivery makes use of various media and delivery tools.

This course builds on what you learned in Introduction to Databases, beginning with a more detailed look at Entity-Relationship (ER) modeling and data normalization. The course introduces additional database objects, including how keys and constraints are used to enforce design restrictions. The course includes more advanced SQL commands and data storage and retrieval in XML documents.

You should already be familiar with ER modeling, data normalization, basic SQL statements, and XML. These are critical content areas and the course reviews and expands on these areas. The remaining areas are new content critical to building efficient and effective database solutions.

The course includes extensive hands-on activities, focusing primarily on standard SQL language statements. Where necessary to treat more advanced concepts, database platform-specific SQL statements and syntax are used.

Assignments are designed to strengthen your writing skills while emphasizing key database design and implementation concepts. You will be expected to explain database solution decisions clearly and concisely.

The course project is structured as a group project. The project will require you to build a database modeled on a business case representing real-world business requirements. You will propose components of the database solution required by the project and have to design database objects not only to meet solution needs, but also to ensure compatibility with other students' database components.

### Instructional Materials and References

**Student Textbook Package**

**Other Required Resources**

In addition to the student textbook package, the following is also required in this course:

- Internet access

**Equipment and Tools**

- Standard classroom PC
- Microsoft Windows XP Professional Service Pack 2 (on virtual machine)
- VMware Player 4.01 (or later) (on host machine of lab computer)
- ITT-Lab virtual machine
- Microsoft Visio (on host machine of lab computer)
- Microsoft Office (on host machine of lab computer)

**References**

**ITT Tech Virtual Library**

Log on to the ITT Tech Virtual Library at http://www.library.itt-tech.edu/ to access online books, journals, and other reference resources selected to support ITT Tech curricula.

**Books**

You may click “Books” or use the “Search” function on the home page to find the following books.

- ITT Tech Virtual Library> Main Menu> Books> Books 24x7
• ITT Tech Virtual Library> Main Menu> Books> NetLibrary

**Periodicals**
You may click “Periodicals” or use the “Search” function on the home page to find the following periodicals.

• ITT Tech Virtual Library> Main Menu> Periodicals>
  o *Database Journal*
• ITT Tech Virtual Library> Main Menu> Periodicals> Proquest Computing>
  o *Computer Weekly*
  o *Information Week*
  o *Journal of Logic and Computation*
  o *SQL Server Magazine*
  o *Worldwide Databases*

**Reference Resources**
You may click “Reference Resources” or use the “Search” function on the home page to find the following reference resources.

• Free Online Dictionary of Computing
• Glossary of Internet Terms
• Webopedia

**Learning Guides**
You may click “Learning Guides” or use the “Search” function on the home page to find the following learning guides.

ITT Tech Virtual Library> Main Menu> Learning Guides> Online Tutorials

• Computer Technical Tutorials
• Edumax
• Programming Tutorials
• SQL Course
• XML Beginner’s Guide

**Other References**
The following resources may be found outside of the ITT Tech Virtual Library, whether online or in hard copy.

**Websites**

• Microsoft Developer Network (MSDN)
  This vendor page links to information about developer tools, languages, and Web and application-specific development.
• MySQL Home Page
  [http://www.mysql.com](http://www.mysql.com)
  This page links to news, demos, applications, and education concerning the MySQL open source database.

All links to Web references outside of the ITT Tech Virtual Library are always subject to change without prior notice.
Course Evaluation and Grading

Evaluation Criteria Table
The final grades will be based on the following categories:

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>10%</td>
</tr>
<tr>
<td>Course Project</td>
<td>15%</td>
</tr>
<tr>
<td>Labs</td>
<td>25%</td>
</tr>
<tr>
<td>Exam I</td>
<td>20%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Exam II</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
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</table>

Grade Conversion Table
The final grades will be calculated from the percentages earned in the course, as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage Range</th>
<th>GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90–100%</td>
<td>4.0</td>
</tr>
<tr>
<td>B+</td>
<td>85–89%</td>
<td>3.5</td>
</tr>
<tr>
<td>B</td>
<td>80–84%</td>
<td>3.0</td>
</tr>
<tr>
<td>C+</td>
<td>75–79%</td>
<td>2.5</td>
</tr>
<tr>
<td>C</td>
<td>70–74%</td>
<td>2.0</td>
</tr>
<tr>
<td>D+</td>
<td>65–69%</td>
<td>1.5</td>
</tr>
<tr>
<td>D</td>
<td>60–64%</td>
<td>1.0</td>
</tr>
<tr>
<td>F</td>
<td>&lt;60%</td>
<td>0.0</td>
</tr>
</tbody>
</table>